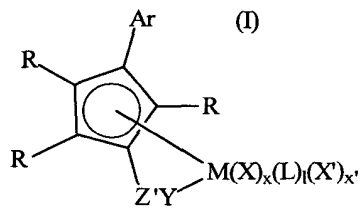


CLAIMS:

1. A polymerization process comprising contacting one or more addition polymerizable monomers selected from the group consisting of ethylene and one or more C_{4-10} α -olefins under polymerization conditions including a temperature from 95 to 160 °C with a catalyst composition comprising a metal complex corresponding to the formula:



wherein,

Ar is an aryl group of from 6 to 30 atoms not counting hydrogen;

- R independently each occurrence is hydrogen, Ar, or a group other than Ar selected from hydrocarbyl, trihydrocarbylsilyl, trihydrocarbylgermyl, halide, hydrocarbyloxy, trihydrocarbylsiloxy, bis(trihydrocarbylsilyl)amino, di(hydrocarbyl)amino, hydrocarbadiylamino, hydrocarbylimino, di(hydrocarbyl)phosphino, hydrocarbadiylphosphino, hydrocarbylsulfido, halo-substituted hydrocarbyl, hydrocarbyloxy- substituted hydrocarbyl, trihydrocarbylsilyl- substituted hydrocarbyl, trihydrocarbylsiloxy- substituted hydrocarbyl, bis(trihydrocarbylsilyl)amino-substituted hydrocarbyl, di(hydrocarbyl)amino- substituted hydrocarbyl, hydrocarbyleneamino-substituted hydrocarbyl, di(hydrocarbyl)phosphino- substituted hydrocarbyl, hydrocarbylenephosphino- substituted hydrocarbyl, or hydrocarbylsulfido- substituted hydrocarbyl, said R group having up to 40 atoms not counting hydrogen atoms;

M is titanium;

- 20 Z' is SiR^6_2 , CR^6_2 , $SiR^6_2SiR^6_2$, $CR^6_2CR^6_2$, $CR^6=CR^6$, $CR^6_2SiR^6_2$, BR^6 , BR^6L'' , or GeR^6_2 ;

Y is -O-, -S-, -NR⁵-, -PR⁵-, -NR⁵₂, or -PR⁵₂;

R⁵, independently each occurrence, is hydrocarbyl, trihydrocarbylsilyl, or trihydrocarbylsilylhydrocarbyl, said R⁵ having up to 20 atoms other than hydrogen, and optionally two R⁵ groups or R⁵ together with Y form a ring system;

- 25 R⁶, independently each occurrence, is hydrogen, or a member selected from hydrocarbyl, hydrocarbyloxy, silyl, halogenated alkyl, halogenated aryl, -NR⁵₂, and combinations thereof, said R⁶ having up to 20 non-hydrogen atoms, and optionally, two R⁶ groups form a ring system;

L'' is a monodentate or polydentate Lewis base optionally bonded to R⁶;

- 30 X is hydrogen or a monovalent anionic ligand group having up to 60 atoms not counting hydrogen;

L independently each occurrence is a neutral ligating compound having up to 20 atoms, other than hydrogen, and optionally L and X are bonded together;

X' is a divalent anionic ligand group having up to 60 atoms other than hydrogen;

z is 0, 1 or 2;

5 x is 0, 1, 2, or 3;

l is a number from 0 to 2, and

x' is 0 or 1,

to prepare a polymer having a melt index greater than 1.0 and a comonomer incorporation greater than 5 weight percent.

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2. A process according to claim 1, wherein at least one R is selected from the group consisting of Ar.

3. A process according to claim 2, wherein the cyclopentadienyl group is substituted
15 at the 3- and 4-position with an Ar group.

4. A process according to any one of claims 1-3, wherein:

Ar is phenyl, naphthyl, 4-bisphenyl, 3-(N,N-dimethylamino)phenyl, 4-methoxyphenyl, 4-methylphenyl, pyrrol-1-yl, or 1-methylpyrrol-3-yl;

20 R is hydrogen, methyl or Ar;

X is chloride, methyl or benzyl;

X' is 2,3-dimethyl-1,3-butenediyl;

L is 1,3-pentadiene or 1,4-diphenyl-1,3-butadiene;

Y is -NR⁵-;

25 Z' is SiR⁶₂;

R⁵ each occurrence is independently hydrocarbyl;

R⁶ each occurrence is independently methyl;

x is 0 or 2;

l is 0 or 1; and

30 x' is 0 or 1;

with the proviso that:

when x is 2, x' is zero, and M is in the +4 formal oxidation state,

when x is 0 and x' is 1, M is in the +4 formal oxidation state, and

when x and x' are both 0, l is 1, and M is in the +2 formal oxidation state.

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5. A process according to claim 1 wherein the metal complex is selected from the group consisting of:

(3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silanetitanium dichloride,

(3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silanetitanium dimethyl, and

5 (3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silanetitanium (II) 1,3-pentadiene.

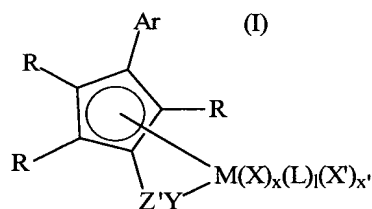
6. A process according to any one of claims 1-3 which is a solution polymerization.

7. A process according to claim 4 which is a solution polymerization.

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8. A polymerization process comprising contacting ethylene, propylene, and optionally one or more of norbornadiene, ethylidene-norbornene, or a C₄₋₄₀ diene or contacting ethylene, a C₄₋₁₀ α-olefin, and one or more of norbornadiene, ethylidene-norbornene, or a C₄₋₄₀ diene under polymerization conditions including a temperature from 95 to 160 °C with a catalyst composition comprising a metal complex corresponding to the formula:

15



wherein,

Ar is an aryl group of from 6 to 30 atoms not counting hydrogen;

R independently each occurrence is hydrogen, Ar, or a group other than Ar selected from
 20 hydrocarbyl, trihydrocarbylsilyl, trihydrocarbylgermyl, halide, hydrocarbyloxy, trihydrocarbylsiloxy, bis(trihydrocarbylsilyl)amino, di(hydrocarbyl)amino, hydrocarbadiylamino, hydrocarbylimino, di(hydrocarbyl)phosphino, hydrocarbadiylphosphino, hydrocarbylsulfido, halo-substituted hydrocarbyl, hydrocarbyloxy- substituted hydrocarbyl, trihydrocarbylsilyl- substituted hydrocarbyl, trihydrocarbylsiloxy- substituted hydrocarbyl, bis(trihydrocarbylsilyl)amino-
 25 substituted hydrocarbyl, di(hydrocarbyl)amino- substituted hydrocarbyl, hydrocarbyleneamino-substituted hydrocarbyl, di(hydrocarbyl)phosphino- substituted hydrocarbyl, hydrocarbylenephosphino- substituted hydrocarbyl, or hydrocarbylsulfido- substituted hydrocarbyl, said R group having up to 40 atoms not counting hydrogen atoms;

M is titanium;

30 Z' is SiR⁶₂, CR⁶₂, SiR⁶₂SiR⁶₂, CR⁶₂CR⁶₂, CR⁶=CR⁶, CR⁶₂SiR⁶₂, BR⁶, BR⁶L", or GeR⁶₂;

Y is -O-, -S-, -NR⁵-, -PR⁵-; -NR⁵₂, or -PR⁵₂;

R^5 , independently each occurrence, is hydrocarbyl, trihydrocarbylsilyl, or trihydrocarbylsilylhydrocarbyl, said R^5 having up to 20 atoms other than hydrogen, and optionally two R^5 groups or R^5 together with Y form a ring system;

R^6 , independently each occurrence, is hydrogen, or a member selected from hydrocarbyl, hydrocarbyloxy, silyl, halogenated alkyl, halogenated aryl, $-NR^5_2$, and combinations thereof, said R^6 having up to 20 non-hydrogen atoms, and optionally, two R^6 groups form a ring system;

L' is a monodentate or polydentate Lewis base optionally bonded to R^6 ;

X is hydrogen or a monovalent anionic ligand group having up to 60 atoms not counting hydrogen;

L independently each occurrence is a neutral ligating compound having up to 20 atoms, other than hydrogen, and optionally L and X are bonded together;

X' is a divalent anionic ligand group having up to 60 atoms other than hydrogen;

z is 0, 1 or 2;

x is 0, 1, 2, or 3;

l is a number from 0 to 2, and

x' is 0 or 1,

to prepare a polymer having a Mooney Viscosity from 0.01 to 10 and a comonomer incorporation greater than 5 weight percent.

9. A process according to claim 8, wherein at least one R is selected from the group consisting of Ar.

10. A process according to claim 8, wherein the cyclopentadienyl group is substituted at the 3- and 4-position with an Ar group.

11. A process according to any one of claims 8-10, wherein:

Ar is phenyl, naphthyl, 4-bisphenyl, 3-(N,N-dimethylamino)phenyl, 4-methoxyphenyl, 4-methylphenyl, pyrrol-1-yl, or 1-methylpyrrol-3-yl;

R is hydrogen, methyl or Ar;

X is chloride, methyl or benzyl;

X' is 2,3-dimethyl-1,3-butenediyl;

L is 1,3-pentadiene or 1,4-diphenyl-1,3-butadiene;

Y is $-NR^5-$;

Z' is SiR^6_2 ;

R^5 each occurrence is independently hydrocarbyl;

R^6 each occurrence is independently methyl;

x is 0 or 2;

l is 0 or 1; and

x' is 0 or 1;

5 with the proviso that:

when x is 2, x' is zero, and M is in the +4 formal oxidation state,

when x is 0 and x' is 1, M is in the +4 formal oxidation state, and

when x and x' are both 0, l is 1, and M is in the +2 formal oxidation state.

10 12. A process according to claim 8 wherein the metal complex is selected from the group consisting of:

(3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silane-titanium dichloride,

(3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silane-titanium dimethyl, and

(3,4-diphenylcyclopentadien-1-yl)dimethyl(t-butylamido)silane-titanium (II) 1,3-pentadiene.

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13. A process according to any one of claims 8-10 which is a solution polymerization.

14. A process according to claim 12 which is a solution polymerization.